

A Newsletter from **Stewart Acoustical Consultants**

and **F.C.Schafer CONSULTING, L.L.C.**

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Making our World Sound Better Since 1979

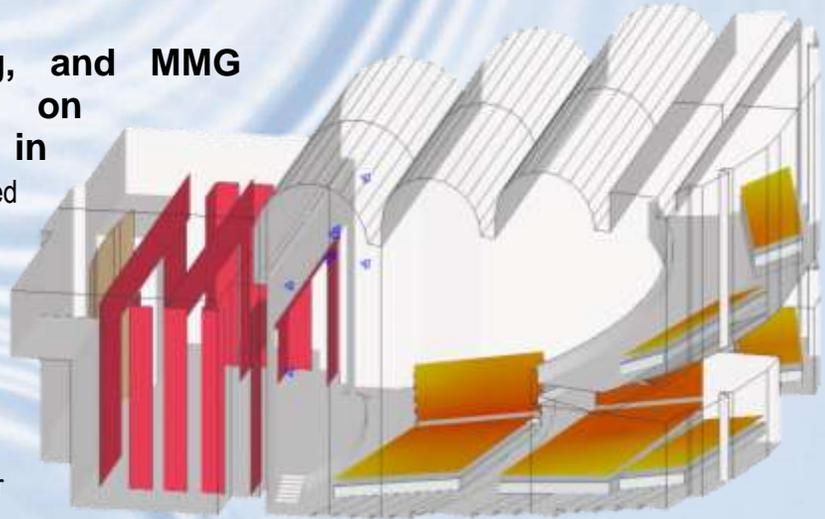
A new instrument for measurements - Finally

For the last 18 years our workhorse instrument for measurements has been the Larson-Davis 2800. It has served us well. Recently, we recognized a need for a backup and a second instrument for concurrent measurements. In this world of rapidly changing electronics, one would think that an instrument as old as the LD 2800 would be obsolete and far behind. However after some research, we quickly realized why it had served us so well. It was ahead of its time. We could not find a single instrument available on the market today that would do everything it would do. The new instruments do provide a few advantages – lighter weight, more memory, the ability to record wave files of sounds easily and easier transfer of data to computers. After much evaluation, we settled on the Bruel & Kjaer 2250 as our new instrument. You will be seeing it more in the field. We have also outfitted the LD 2800 with a new electret condenser microphone similar to that on the B&K instrument for more resistance to humidity in field measurements.



SAC, F. C. Schafer Consulting, and MMG Acoustical Consultants partner on project for an auditorium for CMC in Hyderabad, India

Fred Schafer provided sound system, video, lighting, and stage rigging/curtains design for this multi-purpose auditorium. Mathew George and his firm provided the room acoustics. The sound system is undergoing final system tuning, but it has already been used and the client was very happy with the clarity of the speech during the function. In our next newsletter we hope to bring photos and further information about the project.



Opportunity for School Systems and Universities for Acoustics Assessments -

Facilities planners and management staff need to prioritize their efforts in addressing facilities maintenance and improvements. The timing is right for assessing these needs, so that they can allocate priorities as more funds become available. There may also be a backlog of existing problems they are already aware of that need attention. Also, there is an opportunity to review and update the performance specifications and design standards to be used on future projects. Due to a lull in new school construction projects, our SAC Team is able to offer very affordable fees for these services for the amount of hours involved in these efforts. Please contact Joe Bridger at joe@sacnc.com or at 919-858-0899 ext 2# to discuss these services.

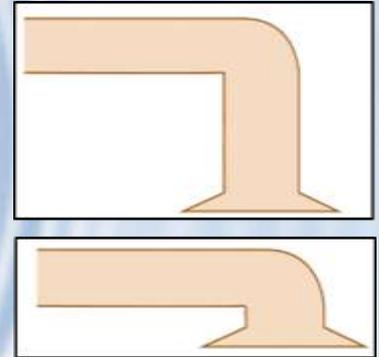
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ShareFile: Securely Share, Sync and Store Large Files in the Cloud – We have begun using ShareFile to store working files on a cloud for easy sharing among our consultants and to transfer large files in and out between ourselves and clients. This allows our team members access to the project files we are working on while not in the office. You may also receive emails from us with a link to download documents from us or to provide us documents using ShareFile. We have found it very useful. ShareFile was developed locally in Raleigh, and is headquartered here, though it is now part of Citrix. If it sounds like something that could help you, feel free to talk to us about it or contact Pari Sethuraman at 919 - 825-3626 and mention our firm for an exclusive Free Demo.

ASHRAE Research on Diffuser Noise - We all know that grilles and diffusers in HVAC systems produce noise as air flows through them. A standard measurement method provides NC ratings for these devices dependent upon the airflow through them. The higher the velocity of air through them the louder they are. The standard test is done with a 10 foot long section of straight duct leading to the grille or diffuser. Thus the air flow is evenly distributed over the grille, resulting in minimum noise. However, in the real world, this rarely occurs. Turns in a duct just above a grille result in uneven airflow over the grille and thus more noise generated where the velocity is greater. This new research helps quantify and provide guidance for situations where there is a turn just above the grille as shown at left. Noise increases are shown to be up to +14 NC. A short summary of the results of the study can be found in a recent ASHRAE Journal article available [here](#).



Chris Barnobi – Consultant – Unlike many other firms, our firm has taken a position that anyone who has the title “Consultant” should have some experience in consulting. Thus, new employees who have not previously worked in consulting must earn the title of “Consultant.” Chris worked for us briefly while in undergraduate school at NC State before going to Virginia Tech for his MS. He then returned to join us in early 2010. Chris has been working primarily on room acoustics and HVAC noise analysis while gaining some experience in environmental projects and sound isolation. Expect to see him more on environmental and sound isolation measurement projects in the future. We congratulate Chris on this achievement.



Operable Partitions - ASTM E557, now titled "Standard Guide for Architectural Design and Installation Practices for Sound Isolation between Spaces Separated by Operable Partitions" has been revised to a -12 version and will soon be available. While some other improvements were made, the major one is the change of title and scope to make it clear to architects and builders that the information in the document is primarily intended for them and not for the suppliers of the partitions. The document primarily covers steps to be taken in the design and construction of the building to allow isolation to be achieved with an operable partition to the degree possible. Historically, the problem with this document has been that architects would not read it but would simply impose it as a requirement on the supplier of the operable partition who was not in a position to do anything about most of the items covered.

Listening to the Data – Those of us in acoustics have long known that we can hear things that are not so obvious in measured data. We hear things that are hard to see in data. Now people other sciences are learning this. They are realizing that they can find hidden information in their data by listening to it. For instance, astronomers have data in the form of radio frequency spectra. They can downshift the frequency to the audio range and generate sound signals they can listen to. Earthquake researchers can upshift the spectrum of ground vibrations and listen to those.





NCAC has a new Website – We hope to have one too soon - The National Council of Acoustical Consultants has unveiled a redesigned website at www.ncac.com. Work is still progressing on some of the search features. Have a look. We are also hoping to unveil a redesign of our website later this year.

Liz to the Rescue – Our friend Dr. Liz von Muggenthaler of Hillsborough does research on animal communication and the perception of sound and vibration by animals (www.animalvoice.com). You may have seen some of her work on Discovery Channel or [MonsterQuest](#) for the History Channel. Most has been on elephants, giraffes, rhinoceros, and large cats, but she has also demonstrated therapeutic benefits of a cat's purr and was the first to record echolocation signals from some underwater species in Lake Champlain. She also offers services to animal owners to help diagnose unusual behavior in animals through her company missdolittle.org. Recently she was called to a local wild animal preserve to observe a tiger that was becoming very upset at a particular golf cart used at the facility. She was able to show that this particular cart was emitting an ultrasonic tone that was disturbing to the tiger. After replacing the golf cart, the tiger calmed down.



Riverbank Acoustical Laboratory – Anyone who has seen many tests of the transmission loss of walls or doors, or the sound absorption of wall panels has probably encountered tests from Riverbank Acoustical Laboratory. Riverbank, near Chicago, was the very first acoustical testing laboratory, built by Colonel George Fabyan on his estate in 1918 for Wallace Clement Sabine who had discovered the basic laws of sound absorption and transmission and needed a laboratory to test materials. Unfortunately, W. C. Sabine passed away before he could use the lab as the result of an illness contracted while serving as an aerial photographer in WWI. Some of the history



of this fascinating place can be found [here](#). The site is important not only for acoustics, but for the original developments in cryptography that occurred there (some call it the birthplace of the CIA), and its unusual architecture. The laboratory business is operated by Alion Science and Technology, successor to the Illinois Institute of Technology Research Institute. However, the building and grounds are now for sale by the individual who owns the estate and resides in the home on the property. It is also rumored that the testing laboratory business may be for sale. If so this would be an opportunity for someone to preserve the history and build a modern laboratory on the 6 acres of vacant cleared land available in the estate.



Hospital Research – Help! – Our colleague Dr. Gary Madaras is doing a research project on acoustical conditions in hospitals. The data are available from annual surveys but the information provided



with these surveys does not identify the age of the hospital facility. Gary is attempting to compare results from hospitals opened in the period of 2000-2010 with older hospitals. He needs to identify completely new hospitals opened on a new site during this period that are not specialty hospitals. Renovated or expanded hospitals on the same site, or specialty hospitals such as children's hospitals or psychiatric hospitals do not

qualify. If you can help us identify any such hospitals please do so by gary@sound-answers.com.

Truth in Advertising – Heaven is Loud – We have recently seen television commercials in the Triangle market encouraging tourism and development in Cabarrus County, NC. The theme is that that Cabarrus County is a slice of Heaven and Heaven is Loud. Well, if you do not know, Cabarrus County is the home of Lowe's Motor Speedway, most of the NASCAR Sprint Cup Teams, and now the Zmax four-lane drag strip. The drag strip was very controversial as neighboring homeowners and local government initially fought it until the developer who also owned Lowe's Motor Speedway threatened to close that facility. The local tourism and development concerns in promoting the county are now making lemonade as best they can.



School Band Rooms – Not So Loud – In our history of design of school band rooms our first priority has always been loudness control, even if means the room has to be very dead because it is not large enough. The major problem in most school band rooms is that they are not large enough to accommodate all the sound produced without becoming so loud that they could damage hearing, especially for the director who is there all day. Many guidelines for design only consider the space to fit the people and equipment without considering the acoustical implications. Large amounts of sound absorption are required to control the loudness. If the room is too small, two things happen. First the room is dead because the reverberation is dependent on the ratio of room size to the absorption. However, a small room is also still loud because everybody is just too close together. Hearing loss of music teachers is a liability issue for schools and must be taken seriously. Research at UNC-G about the importance of protecting their hearing can be found [here](#).



Joyful Noises – Historically in church design we have been concerned about the building envelope isolation when the church was in a noisy location to prevent disruption of services. However, services in many churches are getting louder, to the point that building must be designed to keep the sound in. Recently we have become aware of several cases of churches not designed in a way compatible with their activities and the surrounding community.

LEED 2012 delayed until 2013 and renamed v.4 – Due to an outcry from many of its members and some founders that they need more time to prepare for it and to review its documentation, USGBC has delayed release of the next version of LEED until 2013 and renamed it v.4. A new public comment period will open October 2, 2012, and run thru December 10, 2012. There are major changes in the acoustics sections of the rating system.

U.S. Access Board update – Classroom Acoustics - We corresponded with Marsha Mazz, Director, Office of Technical and Information Services for the U.S. Access Board, whom is the key contact there working with the classroom acoustics ADA rulemaking. Research had been underway at the NIBS (National Institute of Building Sciences). We enquired as to the status of this necessary step before implementing any new rules. She informed me that "The regulatory assessment has been hampered by a lack of appropriate data. We are going to conduct a second phase of the research as soon as we have funds available. It is unlikely that those funds will be available before FY 2013" [which begins in October 2012] "...Federal rulemaking can be a slow process, particularly given the need to demonstrate cost/benefit to the satisfaction of the Office of Management and Budget." Thus it appears delayed until that is completed.

Upcoming Related Events – NC-ASA will be holding its meeting on September 28th, 2012 at the Hampton Inn and Suites in Raleigh. More information coming soon (www.nc-asa.org). Also, alumni of the NCSU CAS/CSV acoustics program are arranging a reunion on September 29th, 2012 in Raleigh. For more information email NCSUnoise@gmail.com.

Fred Schafer – updates from **F.C.Schafer** CONSULTING, L.L.C.

Wireless Microphones - I recently visited a church to assess their room acoustics and sound system. During my visit they shared with me a complaint that their wireless microphones would suffer from interference. When I checked their units I was amazed to find that half of them were in the 700MHz frequency which has been closed to use by wireless microphones since July of 2010. How happen you ask? Well it turns out the answer is that no one had remembered to check and this detail fell through the cracks. The solution to their problem was the purchase of two new wireless microphone systems. This resulted in the question of how they should go about choosing the right system. I therefore created a general check list that may be applied choosing any wireless microphone, in-ear, intercom system – please [click here](#) to download this checklist and other useful information.

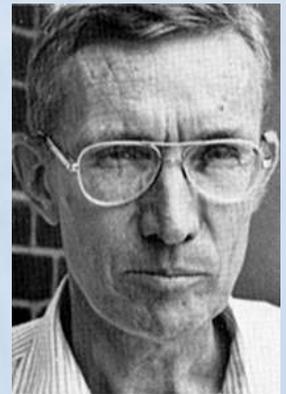


band could this

When do you need an audio systems design consultant? Fred Schafer has provided an article on DIY vs. Contractor vs. Consultant that you can download by [clicking here](#). Many circumstances dictate that a design build contractor is a better way to go than design-bid-build. In such situations, it can be very helpful if the church does not have a strong relationship with a particular design build firm, to hire an independent consultant, who can assist the church with understanding their programming needs, and help them develop an RFP (Request for Proposals), along with a list of recommended design build AV contractors to get proposals from. Then the consultant can review those proposals and give the church feedback on the merits of the proposals. As independent consultants, we can also offer 3rd party/independent performance testing and help with performance specifications.

Auditorium Design – Auditoriums are very complex spaces. Many architects have limited experience in understanding the complexity of these spaces. It is in these spaces where acoustics, noise control, isolation, A/V design, theatrical lighting, special requirements for space planning, sightlines, and rigging all meet. Fred Schafer discusses these in a very informative article that can be downloaded by [clicking here](#).

In Memoriam- Grover Meetze, Jr. – Earlier this year we learned of the passing in early 2010 of Grover Meetze, Jr. of Davidson, NC. After service as a pilot in WWII, Grover developed an interest in acoustics as superintendent of a plant manufacturing acoustical materials and during that period pursued a degree in chemistry from Davidson College. Upon graduation he was hired by the college as a physics instructor and director of the physical plant. Grover pursued his interest in acoustics as an acoustical consultant and after retirement from Davidson also worked for Little Diversified Consulting. He maintained his pilot's license until his death at 87.



Others we have lost recently include **Ken Eldred** who was heavily involved in the development of the Day-Night Sound Level and emphasized the need to normalize it for conditions, **Tom Rose** who probably had the largest library of any consultant in acoustics, **Tic Weissenburger** a former president of NCAC, and **Ron McKay** founder of McKay Conant Hoover

Acoustical Product News

Elevator Rail Isolation – CDM, represented the US by RPG has developed a system for [isolation of elevator rails](#) and other parts of the elevator systems. RPG also has launched an updated and much improved [website](#) making easier to find information on their varied and often unique products.

Acoustical Panel Attachment – [Rotofast](#) provides a system to mount acoustical panels so that they cannot be easily removed. The system is also said to reduce the installation time. With the standard system the panels can be removed, but it is necessary to know exactly where the mounting devices are on the panels.

Narrow Focused Loudspeaker – Several years ago we heard of the concept of using two ultrasonic signals that could combine to produce an audible, narrowly focused beam of sound. This has now been commercialized as the [Audio Spotlight by Hologonics](#).